6.2 Ohm's Law

December 18, 2017 10:44 AM

Georg Simon Ohm (1787-1854)

Ohm's Law $\boxed{V = IR}$

V = potential diff (voltage) [V]
I = current [A]
R = resistance [Ω]

Practice pg 231 #1-3
(1.5KΩ, 12A, 25V)

Resistors - control the amount of current in circuits
- symbol —/\/\/\—
- colour-coded by bands

1st band	2nd band	3rd band	4th band
first digit	second digit	# of zeros after 2nd digit	manufacturer's tolerance

pg 232 6 2 5 5% ⇒ 6200000Ω ±5%

Note: no 4th band means a 20% tolerance

Practice pg 233 #1-4

Ohm's Law applies to metal/metal-like resistors and only if temperature remains the same.

James Prescott Joule (1818-1889) measured heat [illegible] with respect to time (Power)

James Prescott Joule (1818-1889) measured heat released by resistors with respect to time (Power)

$P = I^2 R$

$P = VI \rightarrow P = (IR)I$

$P = \frac{V^2}{R} \leftarrow P = V\left(\frac{V}{R}\right)$

$P = \frac{E}{t}$

Hint: list what you have and are looking for to help decide which formula

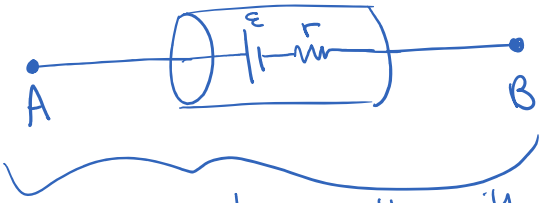
Practice pg 234 # 1-3

$2.4 \times 10^2\ \Omega$, $24\ \Omega$, 220 KJ, 4.5×10^5 J

Batteries/cells have a slight internal resistance (r) such that the measured "terminal voltage" is

$$V_{AB} = \mathcal{E} - Ir$$

V_{AB} = terminal voltage
$\mathcal{E}$ = emf
I = current
r = internal battery resistance



represents a cell with emf and internal resistance

Practice pg 236 #2 then #1
↳ calc current using V and both resistances first

pg 239 # 1-7 (omit 4c)

corrections: pg 239 #1 4.0 KΩ
4h 6×10^{-3} A or 6.0 mA

corrections: pg 239 #1 4.0 kΩ
4b 6×10^{-3} A or 6.0 mA